

Preface

Thank you for purchasing the V8 series AC drive.

The V8 series AC drive is a general-purpose high-performance current vector control AC drive. It can implement the control of asynchronous motor and permanent magnet synchronous motor (PMSM). It increases the user programmable function, background monitoring software and communication bus function, and supports multi-kind PG cards. It is used to drive various automation production equipment involving textile, paper-making, wiredrawing, machine tool, packing, food, fan and pump.

This manual describes the correct use of the V8 series AC drive, including selection, parameter setting, commissioning, maintenance & inspection. Read and understand the manual before use and forward the manual to the end user.

Notes
<ul style="list-style-type: none"><li>• The drawings in the manual are sometimes shown without covers or protective guards. Remember to install the covers or protective guards as specified first, and then perform operations in accordance with the instructions.</li><li>• The drawings in the manual are shown for description only and may not match the product you purchased.</li><li>• The instructions are subject to change, without notice, due to product upgrade, specification modification as well as efforts to increase the accuracy and convenience of the manual.</li><li>• Contact our agents or customer service center if you have problems during the use.</li></ul>

## Introduction

V8 series AC drive incorporates the following improvements:

- 1) Multiple voltage classes  
It provides coverage of single-phase 220 V, three-phase 220 V, three-phase 380 V, three-phase 480 V, three-phase 690 V and three-phase 1,140 V.
- 2) Control of asynchronous motor and PMSM  
It supports vector control of three-phase AC asynchronous motor and three-phase AC PMSM.
- 3) Diversified control modes  
It supports three control modes, namely, sensorless flux vector control (SFVC), closed-loop vector control (CLVC) and V/F control.
- 4) Multiple communication protocols  
It supports communication via Modbus-RTU, PROFIBUS-DP, CANlink and CANopen.
- 5) Multiple encoder types  
It supports various encoders such as differential encoder, open-collector encoder, resolver and UVW encoder.
- 6) All-new SFVC algorithm  
It introduces an all-new sensorless flux vector control (SFVC) algorithm that gives better low-speed stability, enhanced low-frequency loading capacity, and supports torque control.
- 7) Other new functions

The newly added functions of the V8 series AC drive are described as below:

Function	Description
Virtual I/O	It can implement various simple logic functions.
Rapid current limit	It helps to avoid frequent occurrence of overcurrent faults of the AC drive.
Multi-motor switchover	Four motors can be switched over via four groups of motor parameters.
Restoring user parameters	It allows you to save or restore the parameters set by yourself.
Higher-accuracy AI/AO	The AI/AO accuracy can reach almost 20 mv via factory correction or on-site correction.
Customized parameter display	You can customize the parameters that need to be displayed.
Modified parameter display	You can view the modified parameters.

Function	Description
Operation selection at fault occurrence	<p>You can select the reaction of the AC drive to a fault occurring, based on the actual need. The reactions are as below:</p> <ul style="list-style-type: none"> <li>• Coast to stop</li> <li>• Decelerate to stop</li> <li>• Continue to run</li> </ul> <p>You can also select the frequency at which the AC drive continues to run.</p>
PID parameters switchover	Two groups of PID parameters can be switched over via terminals or can be automatically switched over according to deviation.
PID feedback loss detection	The PID feedback loss value can be set to realize PID protection.
DI/DO positive or negative logic	You can set the DI/DO positive or negative logic.
DI/DO response delay	You can set DI/DO response delay time.
Power dip ride through	It ensures that the AC drive continues to run for a short time when an instantaneous power failure or sudden voltage reduction occurs.
Timing operation	The AC drive supports timing operation for 6500 minutes at maximum.

### Product Checking

Upon unpacking, check:

- Whether the nameplate model and AC drive ratings are consistent with your order. The box contains the AC drive, certificate of conformity, user manual and warranty card.
- Whether the AC drive is damaged during transportation. If you find any omission or damage, contact your supplier immediately.

### First-time Use

For the users who use this product for the first time, read the manual carefully. If in doubt concerning some functions or performances, contact the technical support personnel to ensure correct use.

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## Chapter 1 Safety Information and Precautions

In this manual, the notices are graded based on the degree of danger:



**DANGER** indicates that failure to comply with the notice will result in severe personal injury or even death.












**WARNING** indicates that failure to comply with the notice will result in personal injury or property damage.

Read this manual carefully so that you have a thorough understanding. Installation, commissioning or maintenance may be performed in conjunction with this chapter. We will assume no liability or responsibility for any injury or loss caused by improper operation.

## Safety Information

Use Stage	Safety Grade	Precautions
Before installation	 <b>DANGER</b>	<ul style="list-style-type: none"> <li>Do not install the equipment if you find water seepage, component missing or damage upon unpacking.</li> <li>Do not install the equipment if the packing list does not conform to the product you received.</li> </ul>
	 <b>WARNING</b>	<ul style="list-style-type: none"> <li>Handle the equipment with care during transportation to prevent damage to the equipment.</li> <li>Do not use the equipment if any component is damaged or missing. Failure to comply will result in personal injury.</li> <li>Do not touch the components with your hands. Failure to comply will result in static electricity damage.</li> </ul>
During installation	 <b>DANGER</b>	<ul style="list-style-type: none"> <li>Install the equipment on incombustible objects such as metal, and keep it away from combustible materials. Failure to comply may result in a fire.</li> <li>Do not loosen the fixed screws of the components, especially the screws with red mark.</li> </ul>
	 <b>WARNING</b>	<ul style="list-style-type: none"> <li>Do not drop wire end or screw into the AC drive. Failure to comply will result in damage to the AC drive.</li> <li>Install the AC drive in places free of vibration and direct sunlight.</li> <li>When two AC drives are laid in the same cabinet, arrange the installation positions properly to ensure the cooling effect.</li> </ul>

Use Stage	Safety Grade	Precautions
At wiring	 <b>DANGER</b>	<ul style="list-style-type: none"> <li>Wiring must be performed only by qualified personnel under instructions described in this manual. Failure to comply may result in unexpected accidents.</li> <li>A circuit breaker must be used to isolate the power supply and the AC drive. Failure to comply may result in a fire.</li> <li>Ensure that the power supply is cut off before wiring. Failure to comply may result in electric shock.</li> <li>Tie the AC drive to ground properly by standard. Failure to comply may result in electric shock.</li> </ul>
	 <b>WARNING</b>	<ul style="list-style-type: none"> <li>Never connect the power cables to the output terminals (U, V, W) of the AC drive. Pay attention to the marks of the wiring terminals and ensure correct wiring. Failure to comply will result in damage to the AC drive.</li> <li>Never connect the braking resistor between the DC bus terminals (+) and (-). Failure to comply may result in a fire.</li> <li>Use wire sizes recommended in the manual. Failure to comply may result in accidents.</li> <li>Use a shielded cable for the encoder, and ensure that the shielding layer is reliably grounded.</li> </ul>
Before power-on	 <b>DANGER</b>	<ul style="list-style-type: none"> <li>Check that the following requirements are met: <ul style="list-style-type: none"> <li>The voltage class of the power supply is consistent with the rated voltage class of the AC drive.</li> <li>The input terminals (R, S, T) and output terminals (U, V, W) are properly connected.</li> <li>No short-circuit exists in the peripheral circuit.</li> <li>The wiring is secured.</li> </ul> Failure to comply will result in damage to the AC drive </li> <li>Do not perform the voltage resistance test on any part of the AC drive because such test has been done in the factory. Failure to comply will result in accidents.</li> </ul>
	 <b>WARNING</b>	<ul style="list-style-type: none"> <li>Cover the AC drive properly before power-on to prevent electric shock.</li> <li>All peripheral devices must be connected properly under the instructions described in this manual. Failure to comply will result in accidents</li> </ul>
After power-on	 <b>DANGER</b>	<ul style="list-style-type: none"> <li>Do not open the AC drive's cover after power-on. Failure to comply may result in electric shock.</li> <li>Do not touch any I/O terminal of the AC drive. Failure to comply may result in electric shock.</li> </ul>
	 <b>WARNING</b>	<ul style="list-style-type: none"> <li>Do not touch the rotating part of the motor during the motor auto-tuning or running. Failure to comply will result in accidents.</li> <li>Do not change the default settings of the AC drive. Failure to comply will result in damage to the AC drive.</li> </ul>

Use Stage	Safety Grade	Precautions
During operation	 <b>DANGER</b>	<ul style="list-style-type: none"> <li>Do not touch the fan or the discharging resistor to check the temperature. Failure to comply will result in personal burnt.</li> <li>Signal detection must be performed only by qualified personnel during operation. Failure to comply will result in personal injury or damage to the AC drive.</li> </ul>
	 <b>WARNING</b>	<ul style="list-style-type: none"> <li>Avoid objects falling into the AC drive when it is running. Failure to comply will result in damage to the AC drive.</li> <li>Do not start/stop the AC drive by turning the contactor ON/OFF. Failure to comply will result in damage to the AC drive.</li> </ul>
During maintenance	 <b>DANGER</b>	<ul style="list-style-type: none"> <li>Repair or maintenance of the AC drive may be performed only by qualified personnel. Failure to comply will result in personal injury or damage to the AC drive.</li> <li>Do not repair or maintain the AC drive at power-on. Failure to comply will result in electric shock.</li> <li>Repair or maintain the AC drive only ten minutes after the AC drive is powered off. This allows for the residual voltage in the capacitor to discharge to a safe value. Failure to comply will result in personal injury.</li> <li>Ensure that the AC drive is disconnected from all power supplies before starting repair or maintenance on the AC drive.</li> <li>Set and check the parameters again after the AC drive is replaced.</li> <li>All the pluggable components must be plugged or removed only after power-off.</li> <li>The rotating motor generally feeds back power to the AC drive. As a result, the AC drive is still charged even if the motor stops, and the power supply is cut off. Thus ensure that the AC drive is disconnected from the motor before starting repair or maintenance on the AC drive.</li> </ul>

#### General Precautions

##### 1) Requirement on residual current device (RCD)

The AC drive generates high leakage current during running, which flows through the protective earthing (PE) conductor. Thus install a type-B RCD at primary side of the power supply. When selecting the RCD, you should consider the transient and steady-state leakage current to ground that may be generated at startup and during running of the AC drive. You can select a specialized RCD with the function of suppressing high harmonics or a general-purpose RCD with relatively large residual current.

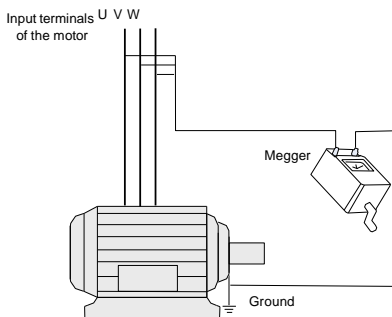
##### 2) High leakage current warning

The AC drive generates high leakage current during running, which flows through the PE conductor. Earth connection must be done before connection of power supply. Earthing shall comply with local regulations and related IEC standards.



### 3) Motor insulation test

Perform the insulation test when the motor is used for the first time, or when it is reused after being stored for a long time, or in a regular check-up, in order to prevent the poor insulation of motor windings from damaging the AC drive. The motor must be disconnected from the AC drive during the insulation test. A 500-V mega-Ohm meter is recommended for the test. The insulation resistance must not be less than 5 MΩ.



### 4) Thermal protection of motor

If the rated capacity of the motor selected does not match that of the AC drive, especially when the AC drive's rated power is greater than the motor's, adjust the motor protection parameters on the operation panel of the AC drive or install a thermal relay in the motor circuit for protection.

### 5) Running at over 50 Hz

The AC drive provides frequency output of 0 to 3200 Hz (Up to 300 Hz is supported if the AC drive runs in CLVC and SFVC mode). If the AC drive is required to run at over 50 Hz, consider the capacity of the machine.

### 6) Vibration of mechanical device

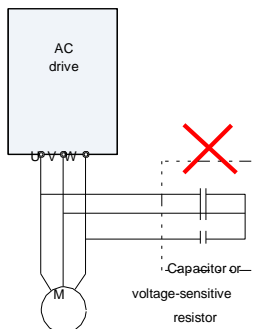
The AC drive may encounter the mechanical resonance point at some output frequencies, which can be avoided by setting the skip frequency.

### 7) Motor heat and noise

The output of the AC drive is pulse width modulation (PWM) wave with certain harmonic frequencies, and therefore, the motor temperature, noise, and vibration are slightly greater than those when the AC drive runs at power frequency (50 Hz).

### 8) Voltage-sensitive device or capacitor on output side of the AC drive

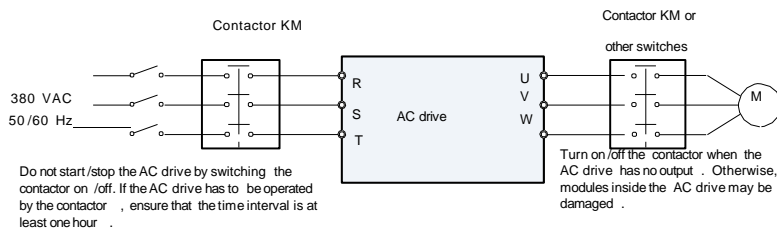
Do not install the capacitor for improving power factor or lightning protection voltage-sensitive resistor on the output side of the AC drive because the output of the AC drive is PWM wave. Otherwise, the AC drive may suffer transient overcurrent or even be damaged.



### 9) Contactor at the I/O terminal of the AC drive

When a contactor is installed between the input side of the AC drive and the power supply, the AC drive must not be started or stopped by switching the contactor on or off. If the AC drive has to be operated by the contactor, ensure that the time interval between switching is at least one hour since frequent charge and discharge will shorten the service life of the capacitor inside the AC drive.

When a contactor is installed between the output side of the AC drive and the motor, do not turn off the contactor when the AC drive is active. Otherwise, modules inside the AC drive may be damaged.



### 10) When external voltage is out of rated voltage range

The AC drive must not be used outside the allowable voltage range specified in this manual. Otherwise, the AC drive's components may be damaged. If required, use a corresponding voltage step-up or step-down device.

### 11) Prohibition of three-phase input changed into two-phase input

Do not change the three-phase input of the AC drive into two-phase input. Otherwise, a fault will result or the AC drive will be damaged.

## 12) Surge suppressor

The AC drive has a built-in voltage dependent resistor (VDR) for suppressing the surge voltage generated when the inductive loads (electromagnetic contactor, electromagnetic relay, solenoid valve, electromagnetic coil and electromagnetic brake) around the AC drive are switched on or off. If the inductive loads generate a very high surge voltage, use a surge suppressor for the inductive load or also use a diode.

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**Note**

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Do not connect the surge suppressor on the output side of the AC.

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## 13) Altitude and de-rating

In places where the altitude is above 1000 m and the cooling effect reduces due to thin air, it is necessary to de-rate the AC drive. Contact us for technical support.

## 14) Some special usages

If wiring that is not described in this manual such as common DC bus is applied, contact the agent or us for technical support.

## 15) Disposal

The electrolytic capacitors on the main circuits and PCB may explode when they are burnt. Poisonous gas is generated when the plastic parts are burnt. Treat them as ordinary industrial waste.

## 16) Adaptable Motor

- The standard adaptable motor is adaptable four-pole squirrel-cage asynchronous induction motor or PMSM. For other types of motor, select a proper AC drive according to the rated motor current.
- The cooling fan and rotor shaft of non-variable-frequency motor are coaxial, which results in reduced cooling effect when the rotational speed declines. If variable speed is required, add a more powerful fan or replace it with variable-frequency motor in applications where the motor overheats easily.
- The standard parameters of the adaptable motor have been configured inside the AC drive. It is still necessary to perform motor auto-tuning or modify the default values based on actual conditions. Otherwise, the running result and protection performance will be affected.
- The AC drive may alarm or even be damaged when short-circuit exists on cables or inside the motor. Therefore, perform insulation short-circuit test when the motor and cables are newly installed or during routine maintenance. During the test, make sure that the AC drive is disconnected from the tested part.